

SEP 26 2006

AMENDMENT TO THE CLAIMS:

This listing of claims will replace all prior versions of claims in the application:

LISTING OF CLAIMS:

- 1 1. (Canceled) A magnetic head, comprising:
  - 2 a magnetoresistive sensor including a ferromagnetic free layer having first and
  - 3 second laterally opposed ends, and
  - 4 an electromagnet having first and second pole ends adjacent said first and second
  - 5 laterally opposed ends of said free layer for biasing a magnetization of said
  - 6 ferromagnetic free layer in a predetermined direction.
  
- 1 2. (Canceled) A magnetic head as in claim 1, wherein said electromagnet further
- 2 includes:
  - 3 a magnetic yoke; and
  - 4 an electrically conductive coil formed about a portion of said yoke.
  
- 1 3. (Canceled) A magnetic head as in claim 2 wherein said yoke is formed with a gap to
- 2 prevent electrical current from flowing through said yoke from said first pole end to said
- 3 second pole end.
  
- 1 4. (Canceled) A magnetic head as in claim 2 further comprising first and second leads
- 2 formed over said yoke.

1 5. (Canceled) A magnetoresistive sensor as in claim 3, wherein said yoke includes first  
2 and second portions separated by said gap and further comprising first and second  
3 electrically conductive leads formed over said first and second portions respectively of  
4 said yoke.

1 6. (Canceled) A magnetic head, comprising:  
2 a magnetoresistive sensor having first and second laterally opposed sides;  
3 a first magnetic layer having an end abutting said first side of said  
4 magnetoresistive sensor, and extending from said sensor;  
5 a second magnetic layer having an end abutting said second side of said  
6 magnetoresistive sensor, and extending from said sensor; and  
7 an electrically conductive coil formed about a portion of at least one of said first  
8 and second magnetic layers.

1 7. (Canceled) A magnetic head as in claim 6, comprising:  
2 first and second electrically conductive leads formed over said first and second  
3 magnetic layers respectively.

1 8. (Canceled) A magnetic head as in claim 6, wherein said coil comprises:  
2 a first set of parallel electrically conductive lines formed at a first elevation;  
3 a second set of parallel electrically conductive lines formed at a second elevation;  
4 and

5           a set of electrically conductive vias electrically connecting at least a portion of  
6           said first electrically conductive lines with said second set of electrically conductive  
7           lines.

1   9. (Original) A magnetic head comprising:  
2           a magnetoresistive sensor having first and second laterally opposed sides;  
3           a first front magnetic bias layer having a proximal end abutting said first side of  
4           said sensor and having a distal end;  
5           a second front magnetic bias layer having a proximal end abutting said second  
6           side of said sensor and having a distal end;  
7           a back magnetic bias layer having first and second ends;  
8           an electrically conductive coil formed about a portion of said back magnetic bias  
9           layer;  
10          a portion of said first front bias layer overlapping a portion of said back bias  
11          layer;  
12          a portion of said second bias layer overlapping a portion of said back bias layer;  
13          and  
14          said first and second front bias layers being electrically isolated from said back  
15          bias layer.

1   10. (Original) A magnetic head as in claim 9 wherein:  
2           said distal end of said first front bias layer overlaps said first end of said back bias  
3           layer; and

4           said distal end of said second bias layer overlaps said second end of said back bias  
5           layer.

1   11. (Original) A magnetic head as in claim 10 further comprising;  
2           a dielectric layer disposed between said first bias layer and said first end of said  
3           back bias layer; and  
4           a dielectric layer disposed between said second bias layer and said second end of  
5           said back bias layer.

1   12. (Currently Amended) A magnetic head as in claim ~~10~~ 11 wherein said dielectric  
2           layer formed between said first front bias layer and said first end of said back bias layer,  
3           and said dielectric layer formed between said second front bias layer and said second end  
4           of said back bias layer are each part of a contiguous bias layer.

1   13. (Original) A magnetic head as in claim 9 wherein said first and second front bias  
2           layers and said back bias layer are formed of a soft magnetic material.

1   14. (Original) A magnetic head as in claim 9 wherein said first and second front bias  
2           layers and said back bias layer are formed of NiFe.

1   15. (Canceled) A magnetic head as in claim 2, wherein said yoke comprises soft  
2           magnetic material;

1 16. (Canceled) A magnetic head as in claim 2, wherein said yoke comprises a material  
2 selected from the group consisting of NiFe, FeXN (where X is Al, Ta or Co), CoFe,  
3 Sendust, CZT or CZN.

1 17 (Canceled) A magnetic head as in claim 6, wherein said first and second magnetic  
2 layers comprise a soft magnetic material.

1 18. (Canceled) A magnetic head as in claim 6, wherein said first and second magnetic  
2 layer comprise NiFe

1 19. (Canceled) A magnetic data storage system, comprising:  
2 a magnetic disk  
3 a motor connected with said disk for rotating said disk;  
4 a slider;  
5 an actuator connected with said slider for moving said slider relative to said disk;  
6 a magnetic head connected with said slider, comprising:  
7 a magnetoresistive sensor having first and second laterally opposed sides;  
8 a first magnetic layer having an end abutting said first side of said  
9 magnetoresistive sensor, and extending from said sensor;  
10 a second magnetic layer having an end abutting said second side of said  
11 magnetoresistive sensor, and extending from said sensor; and  
12 an electrically conductive coil formed about a portion of at least one of  
13 said first and second magnetic layers.

1       20. (Canceled) A magnetic data recording system comprising:

2           a magnetic tape;

3           a motor for moving said magnetic tape;

4           a magnetic head mounted adjacent said magnetic tape; said magnetic head

5           comprising:

6                a magnetoresistive sensor having first and second laterally opposed sides;

7                a first magnetic layer having an end abutting said first side of said

8                magnetoresistive sensor, and extending from said sensor;

9                a second magnetic layer having an end abutting said second side of said

10               magnetoresistive sensor, and extending from said sensor; and

11               an electrically conductive coil formed about a portion of at least one of

12               said first and second magnetic layer.